1. Section 224000
Plumbing Fixtures
	1. PART 1  GENERAL
		1. SECTION INCLUDES
			1. Flush valve water closets.
			2. Tank type water closets.
			3. Dual flush water closets.
			4. Bidets.
			5. Waterless urinals.
			6. Wall hung urinals.
			7. Lavatories.
			8. Wall-hung, solid surface, multistation lavatory units.
			9. Glass-fiber-reinforced concrete, multistation lavatory units.
			10. Wall-hung, multistation wash fountains.
			11. All-in-one lavatory system.
			12. All-in-one sanitary cabinet.
			13. Combination faucet and hand dryer.
			14. Deck-mounted hand dryers.
			15. Sinks.
			16. Under-lavatory pipe supply covers.
			17. Bathtubs and showers.
			18. Institutional ligature-resistant showers.
			19. Walk-in soaking tubs.
			20. Shower receptors.
			21. Showers.
			22. Outdoor showers.
			23. Indoor drinking fountains.
			24. Outdoor drinking fountains.
			25. Bottle filling drinking fountains.
			26. Bottle filling stations (fountain retrofit kit).
			27. Electric water coolers.
			28. Bi-level, electric water coolers.
			29. Wash fountains.
			30. Mop sinks.
			31. Service sinks.
			32. Vacuum waste-collection systems.
			33. Emergency eye and face wash.
			34. Emergency showers.
			35. Whirlpool baths.
		2. RELATED REQUIREMENTS
			1. Section 011000 - Summary:  Owner-furnished fixtures.
			2. Section 064100 - Architectural Wood Casework:  Counters for sinks and lavatories.
			3. Section 079200 - Joint Sealants:  Sealing joints between fixtures and walls and floors.
			4. Section 114000 - Foodservice Equipment:  Food service sinks.
			5. Section 115300 - Laboratory Equipment:  Laboratory sinks.
			6. Section 123600 - Countertops:  Counters for sinks and lavatories.
			7. Section 221005 - Plumbing Piping.
			8. Section 221006 - Plumbing Piping Specialties.
			9. Section 223000 - Plumbing Equipment.
			10. Section 260583 - Wiring Connections:  Electrical characteristics and wiring connections.
		3. REFERENCE STANDARDS
			1. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
			2. ASHRAE Std 18 - Methods of Testing for Rating Drinking-Water Coolers with Self-Contained Mechanical Refrigeration; 2008 (Reaffirmed 2013).
			3. ASME A112.6.1M - Floor-Affixed Supports for Off-the-Floor Plumbing Fixtures for Public Use; 1997 (Reaffirmed 2017).
			4. ASME A112.18.1 - Plumbing Supply Fittings; 2024.
			5. ASME A112.18.9 - Protectors/Insulators for Exposed Waste and Supplies on Accessible Fixtures; 2011 (Reaffirmed 2022).
			6. ASME A112.19.1 - Enamelled Cast Iron and Enamelled Steel Plumbing Fixtures; 2024.
			7. ASME A112.19.2 - Ceramic Plumbing Fixtures; 2024.
			8. ASME A112.19.3 - Stainless Steel Plumbing Fixtures; 2022.
			9. ASME A112.19.4M - Porcelain Enameled Formed Steel Plumbing Fixtures; 1994 (Reaffirmed 2009).
			10. ASME A112.19.5 - Flush Valves and Spuds for Water Closets, Urinals, and Tanks; 2022.
			11. ASME A112.19.14 - Six-Liter Water Closets Equipped with a Dual Flushing Device; 2013 (Reaffirmed 2018).
			12. ASME A112.19.15 - Bathtubs/Whirlpool Bathtubs with Pressure Sealed Doors; 2012 (Reaffirmed 2022).
			13. ASSE 1014 - Performance Requirements for Backflow Prevention Devices for Hand-Held Showers; 2020.
			14. ASSE 1016 - Performance Requirements for Automatic Compensating Valves for Individual Showers and Tub/Shower Combinations; 2017 (Reaffirmed 2021).
			15. ASSE 1070 - Performance Requirements for Water Temperature Limiting Devices; 2020.
			16. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2019, with Editorial Revision (2023).
			17. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2021.
			18. ASTM C1822 - Standard Specification for Insulating Covers on Accessible Lavatory Piping; 2021.
			19. ASTM D570 - Standard Test Method for Water Absorption of Plastics; 2022.
			20. ASTM D638 - Standard Test Method for Tensile Properties of Plastics; 2022.
			21. ASTM D696 - Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30°C and 30°C with a Vitreous Silica Dilatometer; 2016.
			22. ASTM D785 - Standard Test Method for Rockwell Hardness of Plastics and Electrical Insulating Materials; 2023.
			23. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
			24. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, with Editorial Revision (2021).
			25. CSA B45.8/IAPMO Z403 - Terrazzo, Concrete, Composite Stone, and Natural Stone Plumbing Fixtures; 2018.
			26. FM (AG) - FM Approval Guide; Current Edition.
			27. IAPMO PS 106 - Tileable Shower Receptors and Shower Kits; 2015, with Editorial Revision.
			28. IAPMO Z124 - Plastic Plumbing Fixtures; 2022, with Editorial Revision.
			29. IAPMO Z1700/CSA B45.13 - Vacuum Waste-Collection Systems; 2019.
			30. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
			31. ISFA 2-01 - Classification and Standards for Solid Surfacing Material; 2013.
			32. ITS (DIR) - Directory of Listed Products; Current Edition.
			33. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.
			34. NSF 61 - Drinking Water System Components - Health Effects; 2024.
			35. NSF 372 - Drinking Water System Components - Lead Content; 2024.
			36. UL (DIR) - Online Certifications Directory; Current Edition.
		4. SUBMITTALS
			1. See Section 013000 - Administrative Requirements for submittal procedures.
			2. Product Data:  Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.
			3. Samples:  Submit two lavatory supply fittings.
			4. Manufacturer's Instructions:  Indicate installation methods and procedures.
			5. Sustainable Design Documentation:  Submit appropriate evidence that materials used in potable water systems comply with the specified requirements.
			6. Maintenance Data:  Include fixture trim exploded view and replacement parts lists.
			7. Waterless Urinals:  Submit recommended frequency of maintenance and parts replacement, methods of cleaning, sources of replacement supplies and parts.
			8. Warranty:  Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.
			9. Maintenance Materials:  Furnish the following for Owner's use in maintenance of project.
				1. See Section 016000 - Product Requirements for additional provisions.
				2. Extra Faucet Washers:  One set of each type and size.
				3. Extra Lavatory Supply Fittings:  One set of each type and size.
				4. Extra Shower Heads:  One of each type and size.
				5. Extra Toilet Seats:  One of each type and size.
				6. Flush Valve Service Kits:  One for each type and size.
				7. Extra Waterless Urinal Trap Seals and Supplies:  One year's worth, based on normal, expected use of facility of this type.
		5. QUALITY ASSURANCE
			1. Manufacturer Qualifications:  Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
		6. MOCK-UP
			1. Provide mock-up of typical bathroom group.
			2. Mock-up may remain as part of the Work.
		7. DELIVERY, STORAGE, AND HANDLING
			1. Accept fixtures on-site in factory packaging. Inspect for damage.
			2. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.
		8. WARRANTY
			1. See Section 017800 - Closeout Submittals for additional warranty requirements.
			2. Provide five year manufacturer warranty for electric water cooler.
	2. PART 2  PRODUCTS
		1. GENERAL REQUIREMENTS
			1. Potable Water Systems:  Provide plumbing fittings and faucets that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.
			2. Water Efficiency:  EPA WaterSense label is required for all water closets, urinals, lavatory faucets, and showerheads.
			3. Maximum Fixture or Faucet Supply Pressure:  60 psi (4.1 bar) unless stated otherwise.
		2. REGULATORY REQUIREMENTS
			1. Comply with applicable codes for installation of plumbing systems.
			2. Comply with UL (DIR) requirements.
			3. Perform work in accordance with local health department regulations.
			4. Provide certificate of compliance from Authority Having Jurisdiction indicating approval of installation.
		3. FLUSH VALVE WATER CLOSETS
			1. Water Closets:
				1. Vitreous china, ASME A112.19.2, floor mounted, siphon jet flush action, china bolt caps.
				2. Bowl:  ASME A112.19.2; 16.5 inches (420 mm) high with elongated rim.
				3. Flush Valve:  Exposed (top spud).
				4. Flush Operation:  Sensor operated.
				5. Handle Height:  44 inches (1117 mm) or less.
				6. Inlet Size:  1-1/2 inches (38 mm).
				7. Trapway Outlet:  4 inch (100 mm, DN).
				8. Color:  White.
				9. Manufacturers:

Zurn Industries, LLC; \_\_\_\_\_\_:  www.zurn.com/#sle.

* + - 1. Flush Valves:
				1. Valve Supply Size:  1 inch (25 mm, DN).
				2. Valve Outlet Size:  1-1/2 inches (40 mm, DN).
				3. Manufacturers:

Zurn Industries, LLC; ZEMS Series:  www.zurn.com/#sle.

* + - 1. Toilet Seats:
				1. Manufacturers:

Zurn Industries, LLC; \_\_\_\_\_\_:  www.zurn.com/#sle.

* + - * 1. Plastic:  Black finish, open front, extended back, self-sustaining hinge, brass bolts, with cover.
			1. Water Closet Carriers:
				1. Manufacturers:

Zurn Industries, LLC; Z1201-N:  www.zurn.com/#sle.

* + - * 1. ASME A112.6.1M; adjustable cast iron frame, integral drain hub and vent, adjustable spud, lugs for floor and wall attachment, threaded fixture studs with nuts and washers.
		1. TANK TYPE WATER CLOSETS
			1. Manufacturers:
				1. Zurn Industries, LLC; \_\_\_\_\_\_:  www.zurn.com/#sle.
			2. Wall-Hung Bowl:
				1. ASME A112.19.2; vitreous china, reverse trap, whirlpool action close-coupled closet combination with regular rim, insulated vitreous china closet tank with fittings and lever flushing valve, chrome plated bolt caps.
				2. Water Consumption:  1.6 gal (6 L) per flush, maximum.
				3. Handle Height:  44 inches (1117 mm) or less.
				4. Trapway Outlet:  4 inch (100 mm, DN).
				5. Water Closet Carrier:

Manufacturers:

Zurn Industries, LLC; \_\_\_\_\_\_:  www.zurn.com/#sle.

ASME A112.6.1M; adjustable cast iron frame, integral drain hub and vent, adjustable spud, lugs for floor and wall attachment, threaded fixture studs with nuts and washers.

* + 1. DUAL FLUSH WATER CLOSETS
			1. Manufacturers:
				1. Zurn Industries, LLC; \_\_\_\_\_\_\_\_:  www.zurn.com/#sle.
			2. ASME A112.19.14; high efficiency and low consumption, vitreous china, dual flush, tank type.
				1. Bowl:  Elongated.
				2. Rough In:  12 inch (305 mm).
				3. Seat:  Manufacturer’s standard or recommended elongated closed front seat with lid.
				4. Color:  White.
		2. WATERLESS URINALS
			1. Manufacturers:
				1. Zurn Industries, LLC; \_\_\_\_\_\_:  www.zurn.com/#sle.
			2. Wall-hung, vitreous china, complying with ASME A112.19.2; one piece bowl and shields, with integral trap, back outlet, carrier, and necessary fittings.
				1. Trapway Outlet Assembly:  Siphon trap type not requiring additional water for drainage of urine; liquid trap seal that is lower specific gravity than water or urine and is biodegradable; completely enclosed cartridge intended to be replaced periodically or refillable liquid trap seal; tamperproof but removable for cleaning and replacement.
				2. Projection From Wall:  Approximately 14 inches (360 mm).
				3. Width:  Approximately 19 inches (490 mm).
				4. Color:  White.
		3. WALL HUNG URINALS
			1. Manufacturers:
				1. Zurn Industries, LLC; \_\_\_\_\_:  www.zurn.com/#sle.
			2. Vitreous china, ASME A112.19.2, wall hung with side shields and concealed carrier.
				1. Consumption Volume:  1.0 gal (3.7 L) per flush, maximum.
				2. Flush Valve:  Exposed (top spud).
				3. Flush Operation:  Sensor operated.
				4. Trapway Outlet:  Integral.
			3. Flush Valves:
				1. Manufacturers:

Zurn Industries, LLC; ZEMS Series:  www.zurn.com/#sle.

* + - 1. Urinal Carriers:
				1. Manufacturers:

Zurn Industries, LLC; Z1221:  www.zurn.com/#sle.

* + - * 1. ASME A112.6.1M; cast iron and steel frame with tubular legs, lugs for floor and wall attachment, threaded fixture studs for fixture hanger, bearing studs.
		1. STALL URINALS
			1. ASME A112.19.2; vitreous china slope front stall urinal with integral flushing rim, removable stainless steel strainer 3/4 inch (19 mm) top spud.
			2. Trapway Outlet:  Integral.
			3. Flush Valves:
				1. Manufacturers:

Zurn Industries, LLC; \_\_\_\_\_\_:  www.zurn.com/#sle.

* + - 1. Stall Urinal Carriers:
				1. Manufacturers:

Zurn Industries, LLC; \_\_\_\_\_\_:  www.zurn.com/#sle.

* + - * 1. ASME A112.6.1M; cast iron and steel frame with tubular legs, lugs for floor and wall attachment, threaded fixture studs for fixture hanger, bearing studs.
		1. LAVATORIES
			1. Manufacturers:
				1. Zurn Industries, LLC; \_\_\_\_\_\_:  www.zurn.com/#sle.
			2. Wall-Hung Basin:
				1. Porcelain-Enamelled Cast Iron:  ASME A112.19.1; white, rectangular basin with splash lip, front overflow, soap depression, and hanger. Size as indicated on drawings with 4-inch (100 mm) centerset spacing.
				2. Carrier:

ASME A112.6.1M; cast iron and steel frame with tubular legs, lugs for floor and wall attachment, threaded studs for fixture hanger, bearing plate and studs.

Manufacturers:

Zurn Industries, LLC; Z1231:  www.zurn.com/#sle.

* + - 1. Supply Faucet:
				1. Deck Mounted Faucet Manufacturers:

Zurn Industries, LLC; Aqua Sense Series:  www.zurn.com/#sle.

* + - * 1. ASME A112.18.1; chrome plated combination supply fitting with pop-up waste, water economy aerator with maximum flow of 2.2 gpm (8.3 L/min), indexed handles.
			1. Metered Faucet:
		1. WALL-HUNG, SOLID SURFACE, MULTISTATION LAVATORY UNITS
			1. Manufacturers:
				1. Zurn Industries, LLC; Sundara Drift Handwashing System:  www.zurn.com/#sle.
			2. Description:  Rectilinear, level-surface deck, seamless and integral elongated basin, with stainless steel enclosed pedestal cabinet.
			3. Deck and Bowl Material:  Fabricate from molded engineered stone material consisting of natural quartz, granite, and other minerals in a matrix of thermoset acrylic modified bio-based polyester resin and meeting requirements of IAPMO Z124.
			4. Surface Burning Characteristics:  Smoke developed index less than 450, and flame spread index less than 25, Class A, when tested in accordance with ASTM E84.
			5. Number of Wash Stations:  Two.
			6. Unit Length:  \_\_\_\_\_ inches (\_\_\_\_\_ mm).
			7. Soap Dispenser:
			8. Color:  As selected by Architect from manufacturer's full line.
			9. Faucet Drilling:  4 inch (100 mm) centerset drilling.
			10. Access Panel:  Stainless steel.
			11. Support Frame:  Wall-mounted, heavy gauge, stainless steel.
		2. MOP SINKS
			1. Manufacturers:
				1. Zurn Industries, LLC; \_\_\_\_\_\_:  www.zurn.com/#sle.
	1. PART 3  EXECUTION
		1. EXAMINATION
			1. Verify that walls and floor finishes are prepared and ready for installation of fixtures.
			2. Verify that electric power is available and of the correct characteristics.
			3. Confirm that millwork is constructed with adequate provision for the installation of counter top lavatories and sinks.
		2. PREPARATION
			1. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.
		3. INSTALLATION
			1. Install each fixture with trap, easily removable for servicing and cleaning.
			2. Provide chrome-plated rigid or flexible supplies to fixtures with loose key stops, reducers, and escutcheons.
			3. Install components level and plumb.
			4. Install and secure fixtures in place with wall supports and bolts.
			5. Solidly attach water closets to floor with lag screws. Lead flashing is not intended to hold fixture in place.
		4. INTERFACE WITH WORK OF OTHER SECTIONS
			1. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.
		5. ADJUSTING
			1. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.
		6. CLEANING
			1. Clean plumbing fixtures and equipment.
			2. See Section 017419 - Construction Waste Management and Disposal for additional requirements.
		7. PROTECTION
			1. Protect installed products from damage due to subsequent construction operations.
			2. Do not permit use of fixtures by construction personnel.
			3. Repair or replace damaged products before Date of Substantial Completion.
		8. SCHEDULES
			1. Fixture Heights:  Install fixtures to heights above finished floor as indicated.
				1. Water Closet:

Standard:  15 inches (380 mm) to top of bowl rim.

Accessible:  18 inches (455 mm) to top of seat.

* + - * 1. Water Closet Flush Valves:

Standard:  11 inches (280 mm) min. above bowl rim.

Recessed:  10 inches (255 mm) min. above bowl rim.

* + - * 1. Urinal:

Standard:  22 inches (560 mm) to top of bowl rim.

Accessible:  17 inches (430 mm) to top of bowl rim.

* + - * 1. Lavatory:

Standard:  31 inches (785 mm) to top of basin rim.

Accessible:  34 inches (865 mm) to top of basin rim.

* + - * 1. Drinking Fountain:

Child:  30 inches (760 mm) to top of basin rim.

Standard Adult:  40 inches (1015 mm) to top of basin rim.

Accessible:  36 inches (915 mm) to top of spout.

* + - * 1. Shower Heads:

Adult Male:  69.5 inches (1765 mm) to bottom of head.

Adult Female:  64.5 inches (1640 mm) to bottom of head.

Child:  58.5 inches (1490 mm) to bottom of head.

* + - 1. Fixture Rough-In
				1. Water Closet (Flush Valve Type):

Cold Water:  1 Inch (25 mm).

Waste:  4 Inch (100 mm).

Vent:  2 Inch (50 mm).

* + - * 1. Water Closet (Tank Type):

Cold Water:  1/2 Inch (15 mm).

Waste:  4 Inch (100 mm).

Vent:  2 Inch (50 mm).

* + - * 1. Bidet:

Hot Water:  1/2 Inch (15 mm).

Cold Water:  1/2 Inch (15 mm).

Waste:  1-1/2 Inch (40 mm).

Vent:  1-1/4 Inch (32 mm).

* + - * 1. Urinal, Waterless:

Waste:  2 Inch (50 mm).

Vent:  1-1/2 Inch (40 mm).

* + - * 1. Urinal (Flush Valve Type):

Cold Water:  3/4 Inch (20 mm).

Waste:  2 Inch (50 mm).

Vent:  1-1/2 Inch (40 mm).

* + - * 1. Urinal (Tank Type):

Cold Water:  1/2 Inch (15 mm).

Waste:  2 Inch (50 mm).

Vent:  1-1/2 Inch (40 mm).

* + - * 1. Lavatory:

Hot Water:  1/2 Inch (15 mm).

Cold Water:  1/2 Inch (15 mm).

Waste:  1-1/2 Inch (40 mm).

Vent:  1-1/4 Inch (32 mm).

* + - * 1. Sink:

Hot Water:  1/2 Inch (15 mm).

Cold Water:  1/2 Inch (15 mm).

Waste:  1-1/2 Inch (40 mm).

Vent:  1-1/4 Inch (32 mm).

* + - * 1. Service Sink:

Hot Water:  1/2 Inch (15 mm).

Cold Water:  1/2 Inch (15 mm).

Waste:  2 Inch (50 mm).

Vent:  1-1/2 Inch (40 mm).

* + - * 1. Service Sink:

Hot Water:  1/2 Inch (15 mm).

Cold Water:  1/2 Inch (15 mm).

Waste:  3 Inch (80 mm).

Vent:  1-1/2 Inch (40 mm).

* + - * 1. Drinking Fountain:

Cold Water:  1/2 Inch (15 mm).

Waste:  1-1/4 Inch (32 mm).

Vent:  1-1/4 Inch (32 mm).

* + - * 1. Bathtub:

Hot Water:  1/2 Inch (15 mm).

Cold Water:  1/2 Inch (15 mm).

Waste:  1-1/2 Inch (40 mm).

Vent:  1-1/4 Inch (32 mm).

* + - * 1. Shower:

Hot Water:  1/2 Inch (15 mm).

Cold Water:  1/2 Inch (15 mm).

Waste:  1-1/2 Inch (40 mm).

Vent:  1-1/4 Inch (32 mm).

1. END OF SECTION